targeted surveillance and early intervention in survivors at highest risk for late-occurring hepatic disease.

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Vitamin D Status and its Correlation with Bone Mineral Density in Long Term Survivors After Childhood Hematopoietic Stem Cell Transplantation

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Introduction: Children undergoing hematopoietic stem cell transplantation (HSCT) are at risk of developing vitamin D deficiency (VDD). However, data on vitamin D status and its correlation with bone mineral density (BMD) in the long term survivors after childhood HSCT is limited. The aim of this study was to determine the prevalence of VDD among long term survivors after HSCT in childhood, and to evaluate the correlations between vitamin D and BMD.

Methods: A retrospective study was carried out in patients seen in Long Term follow-up Clinic (LTFC) at our institution from January 2011 to July 2012. VDD and insufficiency (VDI) were defined as serum 25-hydroxyvitamin D (25-OHD) <15 ng/mL and 15-30 ng/mL, respectively. BMD was measured using dual-energy radiograph absorptiometry (Hologic Delphi). Lumbar, total body, and hip BMD Z scores were determined using manufacturer's normative data based on age. Spearman's correlation was performed to assess correlation between serum 25-OHD levels and different BMD variables.

Results: Ninety eight patients underwent 103 HSCTs between 1990 and 2010. Fifty two (53%) patients were > 5 years out of transplant. A total of 114 vitamin D levels were recorded for the 98 patients, the median 25-OHD level was 26 (range 7 - 68 ng/mL). In 68/114 (60%) observations the 25-OHD levels were less than < 30ng/mL. Of these, 10 (9%) patients had VDD (levels < 15ng/mL, while 58 (51%) had VDI. There were no significant correlations between 25-OHD levels and age at HSCT, gender, underlying diagnosis, type of transplant, or development of acute or chronic GVHD (Table 2). There was a trend towards lower 25-OHD levels after non-TBI based conditioning regimen ($P = .047$). BMD was performed in 83 patients (85%). Low BMD was found in nearly one-third to half of patients tested: 29%, 54%, and 33% of the patients had BMDlumbar, BMDhip and BMDWB Z scores of < -1.0, respectively, while 5%, 9% and 5% of the patients had BMDlumbar, BMDhip and BMDWB Z scores < -2.5, respectively. The median Z scores of the BMDlumbar, BMDhip, and the BMDWB were -0.3 (range - 4.2 to 2.4), -1.1 (range -3.3 to 1.9), and -0.4 (range -5.4 to 2.7) respectively. In patients with BMD < -2.5 and < -1.0, the corresponding median 25-OHD was 26 (range 7 - 62 ng/mL) and there was no significant association. Spearman correlation between 25-OHD D level, BMDWB and BMDlumbar showed a correlation coefficient of -0.24 (P value: 0.0409) and -0.22 (P value: 0.0546) respectively. There was no correlation between normal vitamin D levels, VDI and VDD with BMD of the hip, lumbar spine and whole body.

Discussion: Low 25-OHD (<30 ng/mL) was common (60%) in long term survivors after HSCT during childhood. Similar to other reports, VDD and VDI was seen in 9%, and 51% of the patients respectively. There was only a weak correlation of the 25-OHD levels with BMD of whole body and the lumbar spine, suggesting that factors other than hypovitaminosis D might have contributed to low BMD. There was a small trend of lower 25-OHD levels after non-TBI based conditioning.

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Prevalence of Abdominal Pain Related Functional Gastrointestinal Disorders in Pediatric Recipients of Hematopoietic Stem Cell Transplant

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Background: Consultation for abdominal pain (AP) in pediatric patients following allogeneic hematopoietic stem cell transplant (HSCT) is common. Non HSCT related GI inflammation (infectious and non-infectious) has been associated with post-inflammatory abdominal pain and functional gastrointestinal disorders (FGID) in as high as 60% of cases. The presence of AP and FGIDs after HSCT has not been described. We hypothesized that AP is frequent after HSCT given the inflammation from conditioning, GVHD and infection.

Methods: Patients >2 years from HSCT were offered a Questionnaire of Pediatric Gastrointestinal Symptoms. Those with active gut GVHD were excluded. After completing the surveys, chart reviews were performed focusing on demographics, transplant characteristics, adverse events and long-term outcomes.

Results: 48 patients completed the survey;7 (15%) had abdominal complaints. 3 patients were diagnosed with AP related FGID (dyspepsia, IBS, functional abdominal pain); 4 had AP that did not fit criteria for diagnosis. The group with AP were transplanted for high risk malignancy (71%) – ALL(2), AML (1), Anaplastic Lymphoma (1) and Stage IV Neuroblastoma(1). There was an increased incidence of total body irradiation (TBI) containing regimens (57% vs 39%) in patients with AP, but conditioning regimen intensity ie. myeloablative versus reduced intensity (MA/RIC) was not associated with AP. There was an increased incidence of aGVHD (43.9% vs 29.3%), however surprisingly incidence of GI aGVHD was equal between groups. Those with AP had a higher incidence of second transplants (28.5% vs 4.9%), which were performed for relapse. The AP group also had more frequent abdominal infections (40% vs. 15%). The time interval from HSCT in the AP/FGID group is shorter (4 years), compared to the non-AP group (6 years), $P = .029$; however there were no other significant demographic differences between the two groups.

Conclusions: AP and FGIDs are common after HSCT in children. AP was more frequent in patients <5 yrs from HSCT. Data suggested that TBI, abdominal infections and relapse may be associated with later development of abdominal pain. Larger studies are needed for further evaluation and to confirm these finding. The investigation of post-HSCT AP and FGIDs may help understand the role of inflammation, stress, coping and families on the development of functional abdominal pain.

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Outcomes of Lung Transplantation After Allogeneic Hematopoietic Stem Cell Transplantation

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Background: Pulmonary complications can cause considerable morbidity and mortality after allogeneic hematopoietic stem cell transplantation (HCT). Other than lung transplantation (LT), no specific therapies exist for end-stage lung disease resulting from HCT-related complications such as bronchiolitis obliterans syndrome. Here we describe the indications and outcomes in patients who had LT after HCT for hematologic disease.

Methods: Retrospective chart review of cases identified by the Long-Term Follow Up (LTFU) database at the Fred Hutchinson Cancer Research Center/Seattle Cancer Care Alliance. This database captures information provided by patients, primary physicians and by LTFU clinical service via telemedicine or by medical evaluation on site. Any patient who received a HCT at our institution with a reported history of LT was included.

Results: We identified 9 recipients of allogeneic HCT between 1971 and 2006 who subsequently received LT between 1990 and 2010. The median age at the time of HCT was 16 (range, 10-35) years, and the median age at the time of LT was 34 (range, 17-44) years. The diagnosis at the time of HCT was acute leukemia (n=7), chronic myeloid leukemia (n=1) and aplastic anemia (n=1). The median interval between HCT and LT was 123 (range, 35-326) months. None of the patients had evidence of the original hematologic disorder at time of LT. Indications for LT included pulmonary fibrosis related to any history of radiation or chemotherapy before or as part of the conditioning regimen for HCT (n=4), interstitial pneumonitis related to graft-versus-host-disease (n=1), bronchiolitis obliterans syndrome (n=3), and primary pulmonary hypertension (n=1). All patients received unilateral (n=4) or bilateral cadaveric LT (n=5). Survival at one and five years after LT was 89% and 37%, respectively. Eight of the 9 patients died at a median of 49 months (range, 2 weeks to 87 months), and 1 is alive more than two years after LT. Deaths were attributed to chronic graft rejection and/or pulmonary infectious complications in 6 patients and anoxic brain injury from cardiac and pulmonary arrest in 1 patient. Information about the cause of death for 1 patient who died 2 weeks after LT was unavailable. According to a nationwide registry of organ transplantation (2010 OPTN/STRT Annual Data Report), survival of all LT recipients at one year improved from 72% in 1990 to 85% in 2008; survival at five years improved from 39% in 1990 to 56% in 2004.

Conclusions: LT can prolong survival in some adult and adolescent patients who suffer from end-stage pulmonary complications after HCT. These results can help to inform HCT patients who are considering LT. HCT patients with progressive pulmonary disease, but otherwise in good health, should be referred to an established LT center for evaluation, since early identification of good candidates for LT may result in better survival outcomes.

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GVHD Impact on Quality of Life, Health, Sexuality and Fatigue of Long Term Survivors After Hematopoietic Stem Cell Transplant

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HSCT is a clinical procedure that involves lethal risk. However, it sometimes arises as the only possibility for survival. Patients find a multiplicity of side effects resulting from the illness and its treatment. Graft versus host disease (GVHD) is one of the most important causes of morbidity after HSCT. We designed this study in order to evaluate the impact of graft versus host disease on QoL healtth, sexuality and fatigue in long term survivors after HSCT. This is a prospective seccional study of 214 long term survivors after HSCT, which were divided in two groups for comparison: Group 1 (G1=89) survivors with GVHD e Group 2 (G2=125) without GVHD. G1 was further divided into three groups according to GVHD classification: Group a (Ga) – acute GVHD; Group c (Gc) – chronic GVHD; Grupo ac (Gac) acute and chronic GVHD. Level of satisfaction about QoL, sexuality, health and fatigue were evaluated. All patients had at least 18 years old. Scales used were: WHOQOL, Functional Assessment of Cancer Therapy: Fatigue FACT-F, Karnofsky Performance Status Scale and Socioeconomic demographic survey. Level of significance in all scales was 95% ($p \leq 0.05$) for all risk factors for QoL.

Among survivors from groups G1 and G2, there were more males (61.8% and 67%), married (63% 54.8%), and low socio economic status (67.4% and 61.3) patients. Both groups had similar percentage of survivors with more than eight years of scholarship (67%). Median age of survivor from G1 was 39±10 years and from G2, 32±9.6 years.

Most of G1 survivors (67.4%) were 25.9 ±10.8 years old at the time of transplant versus 19.5±10 years old for G2. Malignant diseases were predominant at G1 (60.7%) when compared to G2 (29.8%). At the time of the study, 73% of survivors from G1 and 82% from G2 had 10 to 15 years after HSCT. Pre and post HSCT Karnofsky scores were similar for both groups: G1 (89.9% e 98.9%), G2 (83.9% e 99.2%). Survivors from both groups reported satisfaction with QoL, health, and sexuality. 65.2% from G1 and 75.4% from G2 reported absence of fatigue. These results show that level of satisfaction of long term survivors with their QoL, health, sexuality and fatigue were favorable in spite of having been diagnosed with acute or chronic graft-versus-host-disease. Transplantation provides an opportunity for changes in subjectivity and in facing life's adversities. It is therefore crucial that the QOL assessment can be part of the clinical protocol, once it provides information about risk factor which allow for the best choice of interventions.

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Allograft Information Exchange (ALLINEX): The Feasibility of Using the Internet for Two Way Information Exchange Between Patients & Tertiary Care - Development & Evaluation

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Introduction: Many recipients of allogeneic haemopoietic stem cell transplant (HSCT) & families need ongoing clinical, psychological & rehabilitative information & support post-transplant. Optimisation of internet resources may ensure easy access to relevant & accurate information. The aims of this three phase project were to (1) assess the psychosocial needs & (2) evaluate the impact of a specifically designed website (Allograft Information Exchange: ALLINEX) as an adjunct to standard care post-HSCT.

Methods: The project was approved by the regional research ethics committee.

Phase one: Assessment of post-transplant standard care (SC) was achieved by 1) cross-sectional patient interview